Serial No. 09/868,566
Art Unit: 1712

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1-14 (Cancelled)

15. (Currently amended) A structural adhesive composition with good low temperature impact strength which comprises:

A) A copolymer having at least one glass transition temperature of -30°C or lower and epoxy-reactive groups or a reaction product of this copolymer with a polyepoxide;

B) A reaction product of a polyurethane prepolymer ~~and~~ with a ~~polypenol~~ polyphenol or aminophenol;

C) At least one epoxy resin;

D) A hardener and optionally a hardening accelerator;

E) Optionally at least one member selected from the group consisting of plasticizers, reactive diluents, ~~rheology~~ rheology aids, fillers, wetting agents, antiagers and stabilizers;

F) At least one polyester polyol with a molecular weight of 400 to 5,000; and

G) Optionally a thermoplastic polymer powder.

16. (Previously presented) The composition claimed in claim 15, wherein component A) comprises a butadiene-based copolymer.

17. (Currently amended) The composition claimed in claim 16, wherein the copolymer of component A) comprises a carboxyl-containing copolymer based on at least one member selected from the group consisting of butadiene/acrylonitrile copolymer, butadiene/(meth)acrylate copolymer, butadiene/acrylonitrile/styrene copolymer and butadiene/(meth)acrylate/styrene copolymer.

18. (Previously presented) The composition claimed in claim 15, wherein the copolymer of component A) comprises a core/shell polymer of which the core polymer is a diene polymer or a (meth)acrylate polymer with a glass transition temperature of -30°C or lower and which may optionally be crosslinked with 0.01 to 5% by weight of a diolefinic comonomer and of which the

shell polymer has a glass transition temperature of 60°C or higher and contains residues of at least one monomer selected from the group consisting of alkyl (meth)acrylate, (meth)acrylonitrile, (methyl) styrene, olefinically unsaturated carboxylic acids, olefinically unsaturated carboxylic anhydrides and mixtures thereof.

19. (Previously presented) The composition claimed in claim 15 wherein component A comprises an adduct of an epoxy resin and a butadiene based copolymer.

20. (Previously presented) The composition claimed in claim 15 wherein component B) comprises a compound of the formula:

$$R^1\text{-}[X\text{-}(C{=}O)\text{-}NH\text{-}R^2\text{-}NH\text{-}(C{=}O)\text{-}Y\text{-}R^3\text{-}(Z)_m]_n \qquad (I)$$

in which

m = 1 or 2,

n = 2 or 3,

R^1 is a residue of a polyalkylene glycol after removal of the functional groups (hydroxyl or amino groups),

R^2 is C_{6-14} alkyl, aryl, aralkyl (residue of a diisocyanate after removal of the isocyanate groups),

X,Y is -O-, -S- or $-NR^4-$, where R^4 = H or C_{1-4} alkyl or phenyl,

R^3 is a carbocyclic-aromatic or araliphatic m+1-functional residue with groups Z directly attached to an aromatic ring and Z is -OH or $-NHR^4$ (residue of a polyphenol or aminophenol after removal of the functional groups).

21. (Previously presented) The composition claimed in claim 15, wherein component B) is dissolved in a liquid polyepoxide.

22. (Previously presented) The composition claimed in claim 15, wherein component B) is reacted with a stoichiometric excess of a polyepoxide.

23. (Previously presented) The composition claimed in claim 15 wherein

D) comprises a latent hardener selected from the group consisting of dicyanodiamide, guanamines, guanidines, aminoguanidines, solid aromatic diamines and mixtures thereof and optionally a hardening accelerator.

24. (Previously presented) A cured composition of claim 15 having an impact peel energy of at least 5 J at -20°C (to ISO 11343).

25. (Previously presented) The production of composite materials, potting compounds in the

electrical and electronics industries and die-attach adhesive for the production of circuit boards in the electronics industry wherein the adhesive comprises the composition of claim ~~24~~ 10.

26. (Cancelled)

~~27.~~ 12 (Previously presented) The method for hardening a composition of claim ~~15~~ 1 which comprises heating the composition to a temperature of 80°C to 210°C.

~~28.~~ 13 (Currently amended) A method for bonding ~~members~~ substrates selected from the group consisting of metallic materials, composite materials and combinations thereof comprising:

I) applying an adhesive composition comprising:

A) 5% to 25% by weight of the adhesive composition of a copolymer with at least one glass transition temperature of -30°C or lower and groups reactive with epoxy resins or a reaction product of the copolymer with a polyepoxide in stoichiometric excess;

B) 5% to 30% by weight of the adhesive composition of a product of the reaction of a polyurethane prepolymer[[,]] with a polyphenol or an aminophenol;

C) [[19]] 10% to 60% by weight of the adhesive composition of an epoxy resin, wherein the epoxy resin comprises a mixture of liquid and optionally solid epoxy resins and optionally low molecular weight epoxy resins as reactive diluents;

D) 1% to 10% by weight of the adhesive composition of a hardener, to one of the surfaces of a substrate to be joined, optionally after at least one of cleaning and surface treatment;

2) fitting the substrates to be joined together;

3) optionally pregelling the adhesive composition; and

4) curing the adhesive composition by heating the substrates to a temperature of from 80°C to 210°C; whereby, a joint with a lap ~~sheer~~ shear strength at room temperature of at least 15 Mpa and a lap shear strength at 90°C greater than 10 Mpa, when the substrates are steel, ~~are~~ is formed, and wherein a low temperature impact resistance measured according to ISO11343 at -20°C as impact peel energy is at least 5J at 2m/sec and wherein B) comprises residues of at least one of hydroxy or amino terminated polytetramethylene glycols.

~~29.~~ 14 (Currently amended) The method of claim ~~28~~ 13 wherein the adhesive composition is cured at a temperature of from 120°C to 180°C.

~~30.~~ 15 (Previously presented) The method of claim ~~27~~ 12 wherein the composition is heated at a temperature of from 120°C to 180°C.

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31. (Currently amended) The method of claim ~~28~~ wherein the adhesive composition further comprises[[;]]:

D) a latent hardener selected from the group consisting of dicyanodiamide, guanamines, guanidines, aminoguanidines, solid aromatic diamines and mixtures thereof and optionally a hardening accelerator;

E) optionally at least one further member selected from the group consisting of ~~plasticizer~~ plasticizers, reactive diluents, rheological auxiliaries, fillers, wetting agents, antiagers and ~~mixture~~ mixtures thereof[[.]];

F) a polyesterpolyol with a molecular weight of ~~form~~ from 400 to 5,000; and

G) optionally a thermoplastic polymer powder.

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32. (Previously presented) The method of claim ~~28~~ wherein B) comprises a compound of the formula:

R^1-[X-(C=O)-NH-R^2-NH-(C=O)-Y-R^3-$(Z)_m]_n$

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33. (Currently amended) The structural adhesive composition of claim ~~15~~; wherein,

A) comprises from 5% to 25% by weight of the ~~adhesive~~ composition;

B) comprises 5% to 30% by weight of the ~~adhesive~~ composition;

C) comprises 10% to 60% by weight of the ~~adhesive~~ composition; and

D) comprises 1% to 10% by weight of the ~~adhesive~~ composition.